

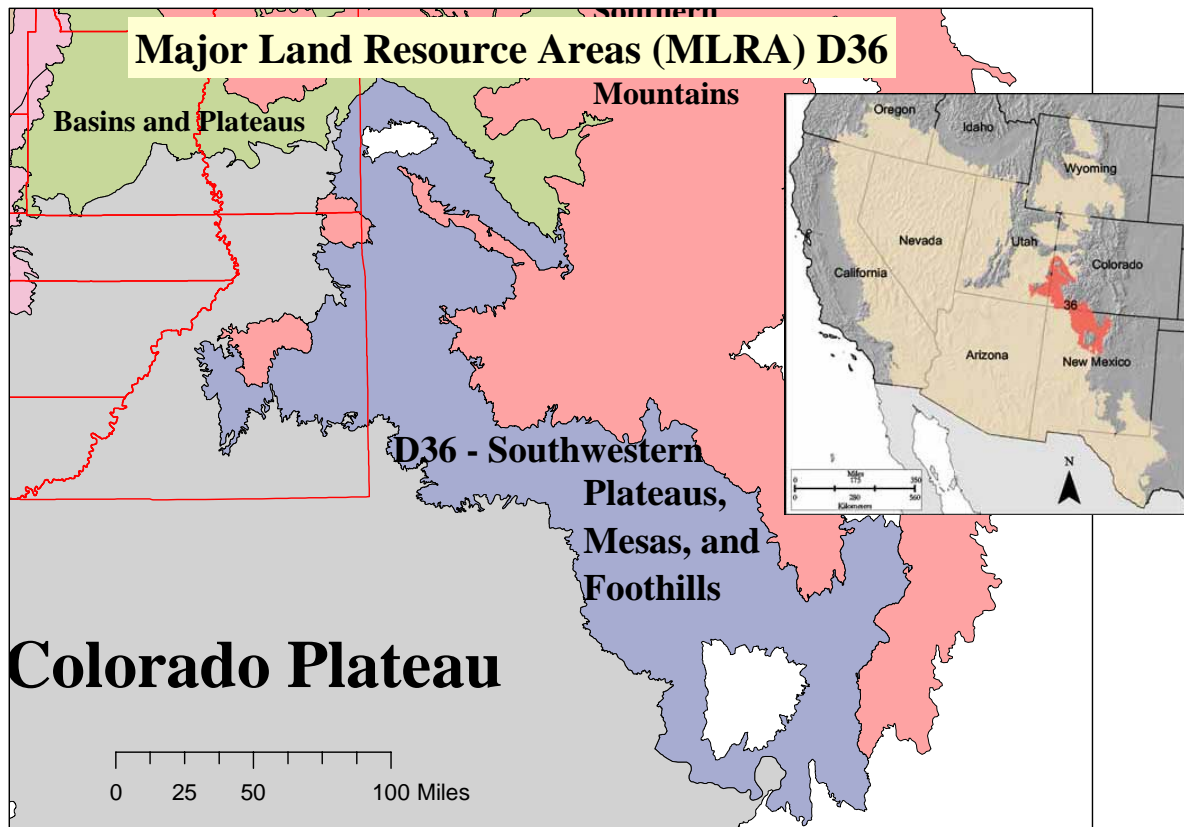
## MLRA 36 – Southwestern Plateaus, Mesas and Foothills

### MLRA 36 – Southwestern Plateaus, Mesas and Foothills (Utah portion)

Ecological Zone	Desert	Semidesert*	Upland*	Mountain*
<b>Precipitation</b>	5 -9 inches	9 -13 inches	13-16 inches	16-22 inches
<b>Elevation</b>	3,000 -5,000	4,500 -6,500	5,800 - 7,000	6,500 – 8,000
<b>Soil Moisture Regime</b>	Ustic Aridic	Ustic	Ustic	Ustic
<b>Soil Temp Regime</b>	Mesic	Mesic	Mesic	Frigid
<b>Freeze free Days</b>	120-220	120-160	100-130	60-90
<b>Notes</b>	Shadscale and blackbrush  300 – 500 lbs/ac	Percent of Juniper production is usually greater than the Pinyon production 400 – 700 lbs/ac	Percent of Pinyon production is usually greater than the Juniper production 100 – 500 lbs/ac 800 – 1,000 lbs/ac	Ponderosa Pine

\*the aspect (north or south) can greatly influence site characteristics.

All values in this table are approximate and should be used as guidelines. Different combinations of temperature, precipitation and soil type can place an ecological site into different zones.



## **36—Southwestern Plateaus, Mesas, and Foothills**

This area is in New Mexico (58 percent), Colorado (32 percent), and Utah (10 percent). It makes up about 23,885 square miles (61,895 square kilometers). The major towns in the area are Cortez and Durango, Colorado; Santa Fe and Los Alamos, New Mexico; and Monticello, Utah. Grand Junction, Colorado, and Interstate 70 are just outside the northern tip of this area. Interstates 40 and 25 cross the middle of the area. Mesa Verde National Park and the Bandelier, Hovenweep, Natural Bridges, Yucca House, and Colorado National Monuments are in the area. Many Indian reservations are in this MLRA. The largest are the Southern Ute, Ute Mountain, and Jicarilla Apache Indian Reservations. Also in the area are the Cochiti, Jemez, Nambe, Navajo, Picuris, Pojoaque, San Felipe, San Ildefonso, San Juan, Sandia, Santa Ana, Santa Clara, Santa Domingo, Taos, Tesuque, and Zia Indian Reservations.

### **Physiography**

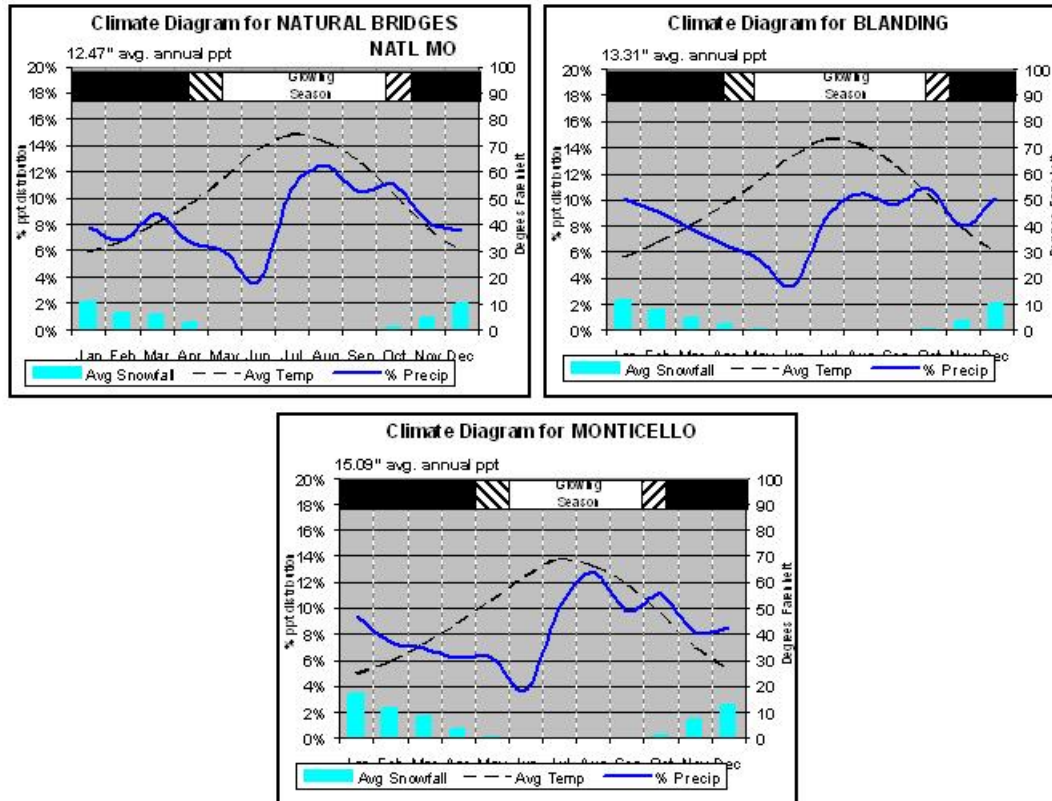
This area is on the Intermontane Plateaus. It is mainly in the Canyon Lands and Navajo Sections of the Colorado Plateaus Province, is partly in the Mexican Highland Section of the Basin and Range Province, and extends marginally into the Southern Rocky Mountains Province. Landforms in most areas are controlled by the underlying sedimentary rock formations, but fluvial landforms are in the Rio Grande rift basin at the southeastern extent of the MLRA. Elevation commonly is 4,600 to 8,500 feet (1,400 to 2,590 meters). It generally is highest (as much as 9,300 feet, or 2,835 meters) in areas of the foothills and high mesas that border the Southern Rocky Mountains. Relief generally is less than 1,500 feet (455 meters). The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Rio Grande-Elephant Butte (1302), 47 percent; San Juan (1408), 32 percent; Upper Colorado-Dolores (1403), 15 percent; Gunnison (1402), 4 percent; Colorado Headwaters (1401), 1 percent; and Upper Colorado-Dirty Devil (1407), 1 percent. The upper reaches of the Rio Grande and San Juan Rivers and their tributaries are in the part of this MLRA near the Colorado and New Mexico State lines. Rio Puerco and Rio Chama are in the part of the MLRA in New Mexico. The Dolores and San Miguel Rivers are in the part in Colorado, and a short reach of the Colorado River crosses this MLRA near the Utah and Colorado State lines.

### **Geology**

Most of the area is characterized by generally horizontal beds of Jurassic, Cretaceous, and Tertiary sedimentary rocks. Representative formations are the Morrison Formation; Dakota Sandstone, Mancos Shale, Cliff House Sandstone, and other members of the Mesa Verde Group; the Animas Formation; and the San Jose Formation. The sedimentary rocks have been eroded into plateaus, mesas, hills, and canyons. Thick deposits of eolian material of Pleistocene age mantle the top of the mesas in some areas. Small areas of Tertiary and Quaternary volcanic rocks, including cinder cones and lava flows, are in the Rio Grande rift basin in New Mexico. Wide valleys in the rift basin have accumulated deep alluvial sediments, and fan remnants are common.

### **Climate**

The average annual precipitation in this area ranges from 8 to 31 inches (205 to 785 millimeters). It is dominantly 12 to 20 inches (305 to 510 millimeters). Much of the rainfall occurs as convective storms in late summer; about 20 to 35 percent of the total precipitation falls in July and August. This proportion increases from north to south within the area. About 15 to 25 percent of the precipitation is snow. Snowpacks are generally light and not persistent throughout the winter, except at the higher elevations. The average annual temperature ranges from 37 to 56 degrees F (3 to 14 degrees C). The frost-free period averages 160 days and ranges from 105 to 210 days. The shortest frost-free periods occur in the northern part of the area and at high elevations.



## Water

Following are the estimated withdrawals of freshwater by use in this MLRA:

Public supply—surface water, 2.1%; ground water, 3.6%

Livestock—surface water, 0.6%; ground water, 0.1%

Irrigation—surface water, 78.7%; ground water, 11.1%

Other—surface water, 0.1%; ground water, 3.7%

The total withdrawals average 1,130 million gallons per day (4,275 million liters per day). About 18 percent is from ground water sources, and 82 percent is from surface water sources. Water commonly is scarce in areas away from the major streams. The Dolores, Animas, and San Juan Rivers, which are perennial streams in the northern end of the area, are major sources of irrigation water. The headwater streams of the Rio Grande also have water of excellent quality. The Navajo, Heron, and El Vado Reservoirs store water for irrigation and recreation in this area. The San Juan River is a high-quality, cold-water fishery stream in northwestern New Mexico. It is used for municipal and industrial supplies as well as irrigation. High salt loads from southern tributary streams affect water quality in this area. The quality of some surface water has been degraded by the effects of upstream mining activities in the late 1800s. This mining occurred mainly in the upper reaches of the streams outside this MLRA. Ground water is the primary source of drinking water in many areas. In places some irrigation water is obtained from deep wells. Cretaceous and Jurassic sediments (Dakota and Morrison Formations and Entrada Sandstone) provide some ground water of variable quality in southwestern Colorado. The ground water in New Mexico is in Tertiary sandstone and in the older sediments. It is soft to hard water and generally exceeds the national drinking water standard for total dissolved solids. Median levels of total dissolved solids are close to 1,000 parts per million (milligrams per liter) in New Mexico. Because of high sodium and sulfate levels, the water is of limited use for drinking in many areas. Fresher water with lower levels of total dissolved solids is near the recharge zones for these consolidated sediments. Very salty water is at depth

and away from the recharge zones. Highly mineralized water leaks into these aquifers from older and younger marine sediments above and below the sandstone aquifers. Some irrigation water is pumped from the valley fill in the larger river valleys. It has a higher salt content than the river water but otherwise is very similar in quality. Seepage of salty water from the adjacent rocks containing soluble salts can increase the sodium sulfate content, which limits the use of the valley fill water.

## **Soils**

The dominant soil orders in this MLRA are Alfisols, Inceptisols, Mollisols, Entisols, and Aridisols. The soil moisture regime is mainly ustic, but an aridic regime that is marginal to ustic occurs in some areas. The soil temperature regime is mesic or frigid. Mineralogy is dominantly mixed or smectitic. In the warmer areas, shallow Ustorthents (Menefee series) formed in residuum on shale hills and mesas. Shallow Torriorthents (Rizno series) formed in material weathered from sandstone on mesas and cuestas. Very deep, loamy Haplargids (Penistaja series) and Haplustalfs (Alire) formed in alluvium derived from sandstone, shale, or granite on mesas or fan remnants. Very deep, clayey Haplustepts (Roques series) formed in alluvium derived from shale on valley sides. Very deep, silty Haplustalfs (Cahona and Wetherill series) formed in eolian material on hills and mesas. In the cooler areas, very deep, clayey Haplustalfs (Goldbug series) formed in slope alluvium derived from sandstone and shale on hills and mesas. Shallow Argiustolls (Fivepine series) formed in slope alluvium and residuum derived from sandstone. Moderately deep Argiustolls (Nortez series) formed in eolian material derived from sandstone on hills and mesas.

## **Biological Resources**

The vegetation is Sagebrush semidesert at the lower elevations. Pinyon-juniper woodland and ponderosa pine forests are at mid elevations. Some common plants are Wyoming big sagebrush, western wheatgrass, galleta, needleandthread, and blue grama at the lower elevations; twoneedle pinyon, Utah juniper, Indian ricegrass, mountain mahogany, ponderosa pine, Gambel oak, Arizona fescue, and muttongrass at mid elevations; and Rocky Mountain Douglasfir, white fir, mountain muhly, common snowberry, Parry's oatgrass, and mountain brome at the higher elevations. Some of the major wildlife species in this area are mule deer, elk, coyote, black bear, mountain lion, black-tailed jackrabbit, Gunnison's prairie dog, badger, piñon jay, black-billed magpie, mountain chickadee, red-breasted nuthatch, white-breasted nuthatch, collared lizard, fence lizard, and western rattlesnake. Reservoirs and rivers provide most of the fish habitat in this area. The ones at the higher elevations have cold-water species, such as rainbow trout and brown trout, and the ones at the lower elevations may have warm-water species, such as bass, bluegill, crappie, and catfish.

## **Land Use**

Following are the various kinds of land use in this MLRA:

Cropland—private, 3%  
Grassland—private, 41%; Federal, 39%  
Forest—private, 7%; Federal, 5%  
Urban development—private, 2%  
Other—private, 3%

Nearly all of this area supports natural vegetation and is used as grazing land or forestland. Cropland also is a significant land use. Where irrigation water is available, irrigated crops, such as wheat, barley, beans, oats, alfalfa, and hay, are grown. An area in Colorado and Utah is used as nonirrigated cropland. The major crops grown on this nonirrigated cropland are beans and winter wheat. The pinyon-juniper woodlands are a source of fuel wood. At the higher elevations, commercial timber is harvested, principally ponderosa pine and Rocky Mountain Douglas-fir. Some urban development is occurring in the vicinity of Santa Fe. The major soil resource concerns are wind erosion, water erosion, maintenance of the productivity of the soils, and management of soil moisture. Conservation practices on cropland generally include crop residue management, minimum tillage, and irrigation water management. Proper grazing use is a concern on

grazing lands. The primary concerns in timbered areas are controlling erosion along roads and skid trails and minimizing surface compaction during timber harvesting.